

A new species of *Amphidromus* Albers, 1850 from Krong Pac District, Dak Lak Province in the Central Highlands, Vietnam

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ABSTRACT This paper describes a new subspecies of *Amphidromus* Albers, 1850 from Krong Pac District, Dak Lak Province in the Central Highlands, Vietnam. Shell coloration and reduced pattern easily separate it from its nearest relatives *Amphidromus hongdaoae* Thach, 2017 and *A. davidmonsecouri* Thach, 2018.

KEY WORDS *Amphidromus*, *persimilis*, Krong Pac District, Dak Lak Province, Vietnam

INTRODUCTION

Two years ago, I received numerous snail shells from Anh Pham labelled as *Amphidromus species* collected at undisclosed locations in Dak Lak and Gia Lai Provinces, southern Vietnam. Even though Anh sent some duplicates to Dr. Thach, and after two books and several papers written by him, this left one Dak Lak snail unnamed. After some time on the market as *Amphidromus species*, it began circulating with an incorrect name, *Amphidromus pervariabilis* var. *protractus* Bavay & Dautzenberg, 1908 a shape variation of a North Vietnamese species. Earlier this year, Andy Tan was sure this snail deserved a separate name and he sent me six more specimens, all collected in Krong Pac District, Dak Lak Province (Figure 1). Armed with this data and further specimens, a study showed them to be quite consistent in shape and colour, with minor variability. This snail has a near solid-yellow shell and is easily separable from its nearest relatives and neighbours, *A. hongdaoae* Thach, 2017 and *A. davidmonsecouri* Thach, 2018, and described herein as a new species.

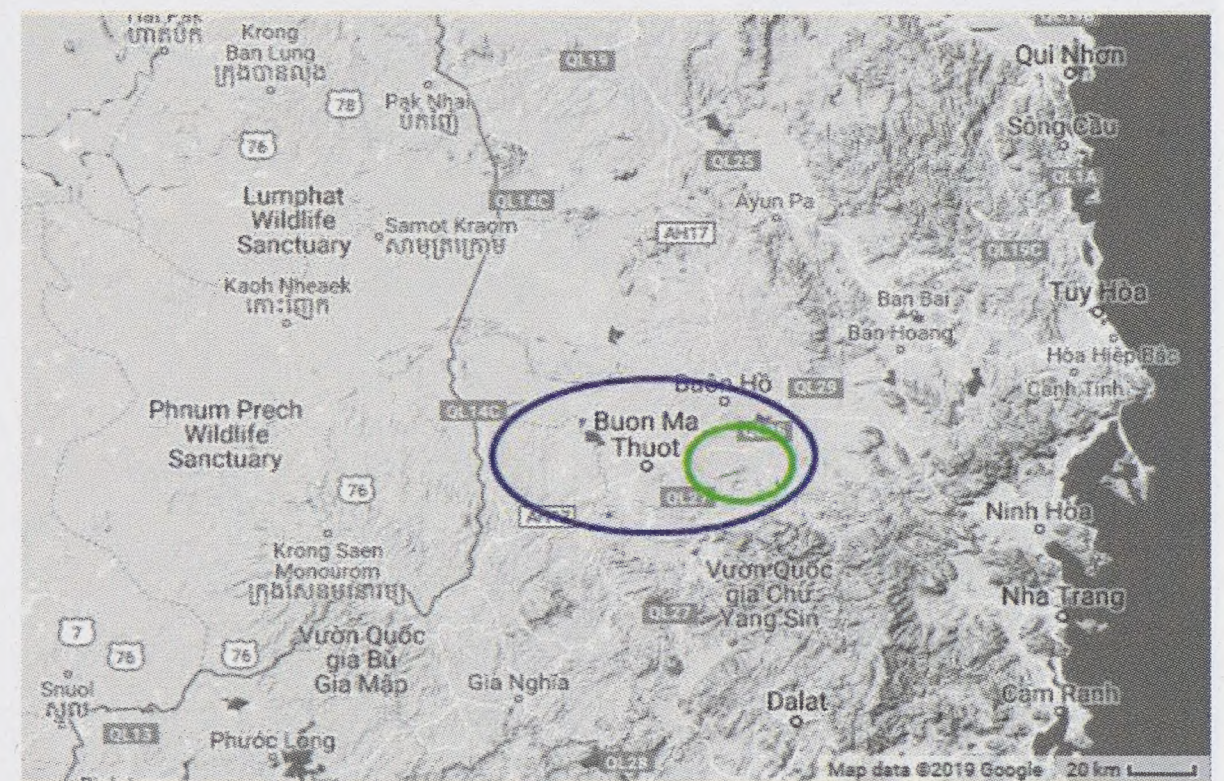


Figure 1. Location map showing the type locality (green oval) and range (blue oval) for *Amphidromus persimilis* n. sp. [Google Maps, 2019]

Materials and Methods

Shells were measured using digital Vernier callipers (0.01 mm resolution), sculpture examined under low magnification (10x) using a jeweler's loupe, and weighed using a pocket-sized electronic scale (capacity 300 g x 0.01 g). Whorl count includes the apex and counted precise to 0.125 (1/8 whorl). 'Paries' (adj. parietal) refers to the 'inner apertural wall' and 'palatum' (adj. palatal) is the 'outer apertural wall'. Relative shell sizes for the genus *Amphidromus* as a whole: small < 35 mm, medium 35-60 mm and large > 60 mm.

Abbreviations used for museums and private collections:

MNHN:	Muséum national d'Histoire naturelle, Paris, France
NBC:	Naturalis Biodiversity Center, Leiden, Netherlands
NHMUK:	Natural History Museum, London, England, UK
RMNH.MOL:	NBC specimen label code, ex-Rijksmuseum van Natuurlijke Historie
SMF:	Senckenberg Naturmuseum, Frankfurt, Germany
AT:	Andy Tan collection
JP:	Jeff Parsons collection

Abbreviations for shell morphometry, shell coiling and other:

D:	shell width (abbreviation for 'diameter' as per literature usage)
H:	shell height
H/D:	shell height/shell width ratio
N:	whorl count
W:	shell weight
DEX:	dextral coiling
SIN:	sinistral coiling
JP	data, observations, comments or other by Jeff Parsons
acq.	Latin <i>acquisītus</i> , <i>acquisītō</i> ablative, "acquired from"
leg.	Latin legit, "he or she collected"

SYSTEMATICS

Family Camaenidae Pilsbry, 1895

Genus *Amphidromus* Albers, 1850

Type species: *Helix perversa* Linnaeus, 1758

Amphidromus persimilis Parsons, new species
(Figure 2; Plate 1, figures 3-8, 15-20,
and Plate 2 figure 27)

Description. (holotype) Shell of medium-size, dextral, tapered-ovate, fairly solid and translucent. Spire long, apex subacute and protoconch punctulate. Very fine spiral wrinkles on teleoconch, overlain by growth lines and microthreads on early whorls and growth threads on mid-whorls; ridgelets sparse on spire and close-set on last whorl, coarser basally. Whorls $5\frac{5}{8}$, convex apically and next ones subconvex. Last whorl not inflated, non-descending, weakly flattened above a rounded periphery and weakly compressed into a basal ridge near the umbilicus. Suture impressed

apically, shallow thereafter, margin regular and subsutural region weakly subcompressed. Periostracum dull buff yellow, masking a gleamy surface below.

Shell almost plain, lower whorls lemon yellow with a faint albous sutural thread and a slightly darker yellow subsutural band, paler apically; early whorls whitish and apex black, fading as a brown apical swirl. A growth stoppage (mora) marks the boundary of the antepenult and penult, indicated by an opaque resting line and noticeable post-mora fading of ground colour. Aperture relatively small, oblique and subovate. Palatum gleamy white, moderately calcified and translucent, but masks external colour. Parietal callus colourless and thinly glazed, its margin very slightly thickened into a colourless parieto-columellar tubercle, falcate and extends c. 5 mm from columella's root. Outer lip gleamy white, strongly reflected, narrow and thickened, its terminus non-ascending; lip face and outer edge flat, lateral profile straight.



Figure 2. Holotype of *A. persimilis* n. sp. NHMUK 20190605/1 (photos by Jeff Parsons)

Type Material. Six adult shells, all from the type locality [leg. anonymous]. **Holotype** (DEX; NHMUK 20190605/1, Figure 2, and Plate 1, figure 3) H 36.94 mm, D 16.38 mm, H/D 2.26, N 7.625 and W 1.06 g. **Paratypes** 1-5 (2 DEX, 3 SIN; Paratype 1 NHMUK 20190605/2, Plate 1, figure 4; others AT, Plate 1, figures 5-8), H 32.84-36.87 (av. 35.08) mm, D 15.28-16.33 (av. 15.81) mm, H/D 2.15-2.30 (av. 2.22), N 7.25-7.625 (av. 7.375) and W 0.65-1.15 (av. 0.872) g.

Other Material Examined. Seven adult shells, type locality (2 DEX, 3 SIN, leg. Pham Ngoc Anh; 1 DEX, acq. Huynh Anh; Plate 1, figures 15-20) and Cu Jut District, Dak Nong Province (1 SIN, acq. Cillan & Don Chan; Plate 2, figure 27) [JP, Figures. 3C-F], H 33.06-38.03 (av. 35.75) mm, D 15.34-17.92 (av. 16.49) mm, H/D 2.02-2.34 (av. 2.17), N 6.875-7.625 (av. 7.357) & W 0.74-1.18 (av. 0.941) g.

Type locality. Krong Pac District, Dak Lak Province in the Central Highlands, Vietnam (Figure 1).

Distribution. Also known from Buon Don District, Dak Lak Province (anonymous source) and Cu Jut District, Dak Nong Province.

Ecology/Habitat. Found among cultivated medicinal herbs at type locality, and found on trunks, limbs and branches, and in hollows of various trees in native forest.

External features of animal. Unknown.

Soft parts. Not available for study.

Etymology. Latin *persimilis* meaning “very similar” due to it being of a similar appearance to its nearest relatives.

Shell Variation. Very little variation to remark on. This species is amphidromine, producing either dextral or sinistral shells. All have the suture very faintly whitened and yellow lower whorls. Most are lemon yellow with a slightly darker yellow or orange-yellow subsutural band, except one that is orange-yellow with an orange subsutural band, with the orange tone washed out in the photo (Plate 1, figure 16). Most have a white protoconch, except dull purple in one shell (Plate 1, figure 19) and early whorls grey in another (Plate 1, figure 18). Apex with a black dot or a black spot that covers much of the first whorl and fades to brown.

Shape is stable, with the upper surface more or less flattened than the holotype. Spire is moderately long or long, generally narrowly tapered, less so in some. Some shells have a less developed basal and the outer lip terminus may be slightly ascending. Palatum moderately calcified in most, less so in some with external colour weakly showing through. Columella as per holotype or somewhat dilated above.

DISCUSSION

A. hongdaoae (Plate 1, figures 9-14) and *A. davidmonsecouri* (Plate 2, figures 21-26) are similar in being amphidromine. Although the type of *A. pervariabilis* var. *protractus* (Figure 9) is sinistral, the species is amphidromine. *A. semitessellatus* (Morlet, 1884) (Plate 1, figure 9) and *A. rhodostylus* Möllendorff, 1901 (Plate 2, figures 32-38) differ in being known only from sinistral shells, and *A. dautzenbergi* Fulton, 1899 differs in having only dextral shells.

A. hongdaoae is of a similar size and similar weight. Differs in having a white spire with chocolate-brown markings, often changing to purple on the penult and sometimes extending onto the last whorl (Plate 1, figure 9), but commonly confluent with a subunicoloured last whorl (Plate 1, figures 10 & 12). Sometimes there are yellow supermedial and submedial bands (Plate 2, figures 11, 13-14). It has a blackish or yellow circumumbilical band and purple or black umbilical interior. Periostracum is olive tinted with or without darker streaks, last whorl sculpture is much finer, the columella has a purplish stain and it lacks a basal ridge.

A. davidmonsecouri is of an equal size or larger and equal weight or heavier. Differs in typically having a sub-unicoloured shell (Plate 2, figure 23), being mostly yellow & white superior zone, but may also be white with yellow bands (Plate 2, figures 21-26) or mostly white (Plate 2,

figures 22, 24-25). The subsutural band is orange-yellow, rose red (Plate 2, figure 22) or rose red changing to pomegranate purple near the lip (Plate 2, figure 25). It commonly has a purple or black umbilical interior and a dual-coloured circumumbilical band (black plus dark vinaceous outer border), or that is yellow (Plate 2, figure 24). Periostracum is almost colourless with olive streaks to olive tinted with darker streaks, last whorl sculpture is weaker and more widely spaced or much finer, the columella has a purplish stain and it lacks a basal ridge.

A. semitessellatus is of an equal size or smaller with a weaker sculpture. Differs in having lower whorls yellow tinted covered by a yellowish fawn periostracum, violaceous-nigrescent subsutural band, sometimes a similar coloured basal band and upper whorls have two irregularly, interrupted castaneous zones. It has a larger aperture and a less elongated, wider spire.

A. rhodostylus is of an equal size or larger. Differs in typically having a white or yellow shell with a brown subsutural band and brown circumumbilical band (Plate 2, figure 33). The subsutural band may be reddish (Plate 2, figure 34) or the circumumbilical band is wider and a black-brown basal band (Plate 2, figure 35). Differs in having various patterns with a narrow zone of ground colour below the suture, such as upper whorls streaked with dark brown, the last fire red with fading blackish stripes (Plate 2, figure 36). Brown streaks fading toward the aperture (Plate 2, figure 37) or those on the base merge to form a sub-confluent zone (Plate 2, figure 38) or broad brown stripes all over. Streaks merge with last two whorls monochrome brown, with a greenish or reddish tinge (Plate 2, figure 20). Periostracum may have greenish lines behind the lip and the columella has a reddish stain.

A. dautzenbergi is slightly larger, has a similarly tapered base lacking a basal ridge, wider spire and larger aperture. Suture has an obsolescent subangular periphery, a wider white margin, paler ground colour and lacks a coloured subsutural band. It has obscure spiral striae crossed by weak transverse sculpture and the last half whorl is indistinctly malleated, and flared outer lip.

A. pervariabilis var. *protractus* is larger and of a similar shape. It has a similarly tapered base with a more developed basal ridge. Differs in have a greyish white shell and lacks a coloured subsutural band. The species itself has a wide range in size and shape, protoconch is whitish with or without a dark brown or reddish apex, which when present the colour may extend onto the protoconch. It is sometimes imperforate, has coarser spiral striations and much weaker transverse sculpture. It has a deciduous and lutescent periostracum, which is virescent on the base of the last whorl, and a slightly flared or reflected outer lip.

A. (Syndromus) adamsii var. *aureocinctus* is of a similar size, smaller or larger and similar shape, although more convex whorls. Overall coloration and pattern features are similar, but with a greater contrast between ground colour and subsutural band. The ground is a faint greyed yellow, subsutural band is golden yellow and periostracum is yellowish fawn and somewhat shiny, columella is abapertural and the umbilicus almost or is closed.

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Plate 1. *Amphidromus persimilis* n. sp. compared to *A. hongdaoae*, with figure numbers listed below.

First row, figs. 3-8 type specimens of *A. persimilis* n. sp., 3 holotype, 4 paratype 1, 5-8 paratypes 2-5;

Second row, figs. 9-14 *A. hongdaoae* Phu Thien District, Gia Lai Province (11 bleached);

Third row, figs. 15-20 *A. persimilis* n. sp. non-type shells from the type locality: 15 shell 7, 16 shell 8, 17 shell 9, 18 shell 10 (bleached), 19 shell 11 (bleached) and 20 shell 12.

[Photo credits: 3-25 JP; 26 Maestrati, 2012 - MNHN; 27 Caballer, 2019 - MNHN; 28 Natural History Museum, 2019a; 29 Natural History Museum, 2019b; 30 Bioportal, 2016; and 31-36 in B/W as published on Plate 22 in Zilch, 1953]



Plate 2. Comparison with various other *Amphidromus* species, with figure numbers listed below.

First row, figs. 21-26 *A. davidmonsecouri* Krong Bong District, Dak Lak Province

Second row, fig. 27 *A. persimilis* n. sp. non-type shell from Dak Nong Province, shell 13; and **figs. 28-32** congeners from Cambodia, Borneo and Vietnam: **28.** *A. semitessellatus* lectotype MNHN-IM-2000-1985 Kampot Province, S. Cambodia. **29.** *A. pervariabilis* var. *protractus* syntype MNHN-IM-2000-2051 Lao Cai Province, N. Vietnam. **30.** *A. dautzenbergi* holotype NHMUK 1899.12.18.38 N. Vietnam. **31.** *A. adamsii* var. *aureocinctus* lectotype NHMUK 1896.6.13.34 N. Borneo. **32.** *A. rhodostylus* var. *subconfluens* RMNH.MOL.288417 (yellow-lipped variant) Pha-rang, Ninh Thuan Province, Vietnam

Third row, figs. 33-38 named variations of *A. rhodostylus*, all holotypes from Pha-rang, Ninh Thuan Province, Vietnam: **33** *simplex* (typical form) SMF 122336, **34** *roseolineatus* SMF 122337, **35** *nigrolineatus* SMF 122338, **36** *igneus* SMF 122339, **37** *rhabdotus* SMF 122340 and **38** *bipartitus* SMF 122342.